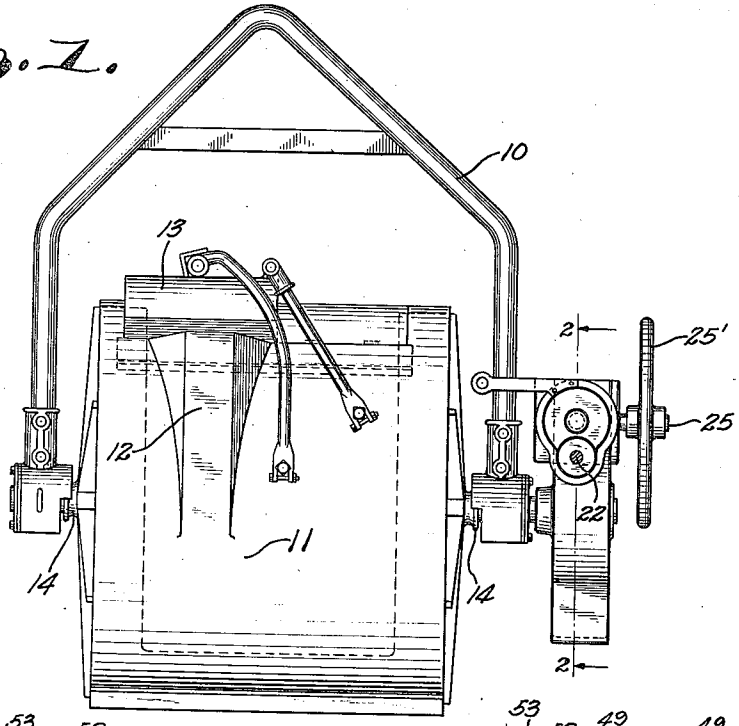
July 25, 1939. M. W. GOLDBERG 2,167,451

AUTOMATIC OILER

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Fig. 1.



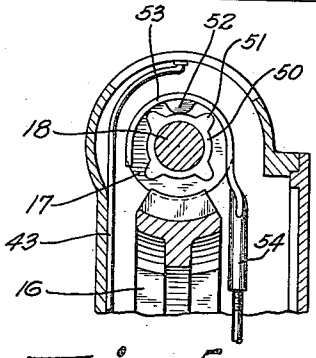


Fig. 5.

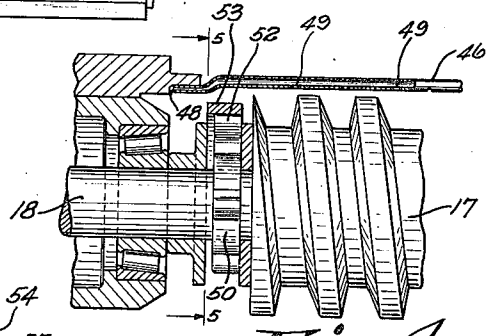


Fig. 4.

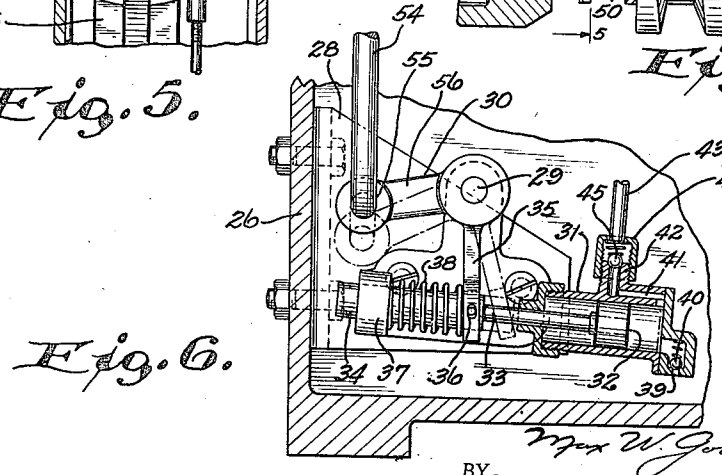


Fig. 6.

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Fig. 2.

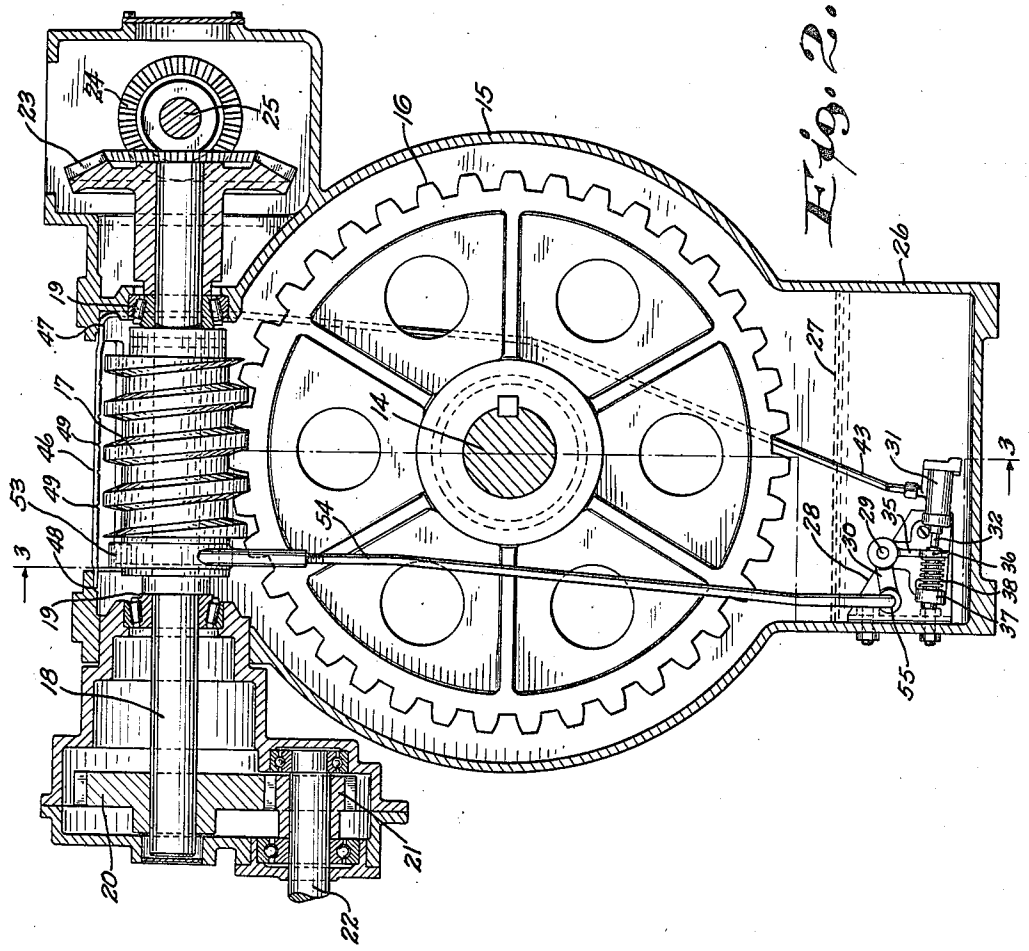
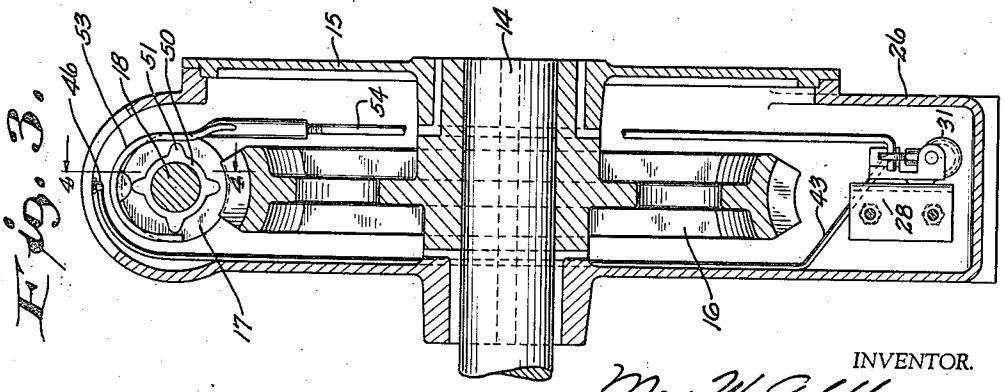


Fig. 3.



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AUTOMATIC OILER

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Application December 30, 1937, Serial No. 182,458

3 Claims. (Cl. 184—6)

This invention relates to improvements in automatic oilers and more particularly to oilers used in connection with the tilting mechanism for foundry ladles.

Foundry ladles of the type which are supported by a bail for the transportation of molten metal from part of a foundry to another, are frequently of such large size as to require the use of mechanism for facilitating the tilting of the ladles during pouring. This mechanism usually comprises a worm and worm wheel, and the teeth of the latter as well as the bearings for the worm shaft, are subjected to stresses which result in excessive wear during use.

It is therefore a principal object of the present invention to provide in a device as above described, means for automatically insuring proper lubrication of those parts of the tilting mechanism which are subject to wear.

A further object of the invention is to provide an automatic oiling device which is well adapted for more general use in other similar mechanisms.

A more specific object of the invention is to provide in combination with mechanism including a rotatable shaft, a reservoir, a pump for delivering oil from said reservoir, means on the shaft for automatically operating said pump when the shaft is rotated, and means for conducting the oil from the reservoir and pump to the parts to be lubricated.

A further object of the invention is to provide a device as above described, including cam operated means for actuating the oil pump.

A still more specific object of the invention is to provide a construction as above described wherein the cam operated mechanism operates to provide for the suction stroke of the pump and wherein yielding means operates to provide for the ejecting stroke.

With the above and other objects in view, the invention consists of the improved automatic oiler and all its parts and combinations as set forth in the claims and all equivalents thereof.

In the accompanying drawings illustrating one complete embodiment and the preferred adaptation of the invention, in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a front elevational view of a ladle embodying the features of this invention and showing one adaptation thereof;

Fig. 2 is an enlarged sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary detail view on an enlarged scale showing the position of the lubricant discharge tube and taken on line 4—4 of Fig. 3;

Fig. 5 is a fragmentary sectional view taken on line 5—5 of Fig. 4; and

Fig. 6 is an enlarged sectional view showing a fragment of the oil reservoir with the pump positioned therein, part of the latter being shown in longitudinal section.

Referring more particularly to the drawings, the numeral 10 designates a bail which may be suitably supported by any ladle holding and transporting mechanism. A ladle 11 having a pouring spout 12 and a movable cover 13 is suitably supported for tilted movement by trunnions 14 which are journaled in bearings formed on the lower ends of the bail. This ladle may be of any suitable type.

One of the trunnions 14 projects through its bearing into a housing 15 (see Fig. 2) and has keyed thereon a worm wheel 16. The worm wheel cooperates with a worm 17 mounted on a horizontally disposed shaft 18, said shaft preferably being journaled in roller bearings or the like 19.

One end of the worm shaft 18 may carry a pinion 20 engageable with another pinion 21 mounted on a shaft 22. If the tilting of the ladle is motor operated, the drive shaft of the motor may be suitably connected with the shaft 22 to thereby cause rotation of the shaft 18, worm 17, worm wheel 16, and resulting tilting of the ladle for pouring purposes.

Means may also be provided to permit operation of the tilting mechanism by hand. In this case, the other end of the shaft 18 may carry a bevel gear 23 which engages a complementary bevel gear 24 mounted on a shaft 25. The shaft 25 projects exteriorly of the housing and carries a hand wheel 25'.

Quite often these ladles are relatively large in size and the weight of the metal therein is considerable, so that during tilting movement of the ladle, substantial strain is placed upon the teeth of the worm and worm wheel, and upon the bearings for the worm shaft. It is therefore highly desirable to provide means for properly lubricating these parts whenever operation of the tilting mechanism takes place.

Accordingly, the lower portion of the housing 15 is extended as at 26 to provide a suitable reservoir for oil 27. A suitable supporting bracket 28 may extend into the reservoir from one of the walls of the housing portion 26, and suitably pivoted to said bracket 28 as at 29, is a bell crank 30.

The pump proper may comprise a cylinder 31 suitably supported by the bracket 28 having a piston 32 operable therein. The stem 33 of the piston may project from one end of the cylinder and be provided with an enlarged sleeve portion 34 which sleeve is rigidly connected to the stem 33. One of the arms 35 of the bell crank has its lower end pivoted to the inner end of the sleeve as at 36 and the outer end of the sleeve is adapted to slide in a bearing 37. A spring 38 is disposed between the arm 35 and the bearing 37.

The pump cylinder is provided with an inlet opening 39 for oil normally closed by a non-return check valve 40. The cylinder is also formed with a discharge passage-way 41 communicating with a tubular boss 42, and a discharge tube 43 may be suitably connected by means of a nut 44 to the boss. A check valve 45 controls the discharge opening. As a result of the above, upon retraction of the piston 32, oil is drawn into the cylinder from the reservoir 26, the valve 40 being automatically opened during this procedure. Upon return movement of the piston, the valve 40 is urged to closing position, and the valve 45 is opened, allowing the oil in the cylinder to be discharged into the discharge tube or conduit 43.

The discharge conduit 43 may extend to any suitable location wherein the need for lubrication is present. In the particular adaptation of the invention illustrated, the discharge tube has a horizontally disposed portion 46 above the worm. The discharge portion is provided with an aperture 47 for directing oil onto the bearing 19, and with an open end 48 for directing oil onto the other bearing 19, and with a plurality of other openings 49 for directing oil onto the worm.

Mounted rigidly on the shaft 18 for the worm, is a cam member 50 having a plurality of cam projections, preferably four in number thereon. These cam projections are adapted to cooperate with a depending cam part 52 carried by the hook shaped upper end 53 of an actuating rod 54 (see Figs. 3 and 5). The lower end of the actuating rod is pivotally connected as at 55 with the other arm 56 of the bell crank 30.

As a result of the above construction, whenever the shaft 18 is rotated to cause tilting of the ladle, the cam member 50 will be rotated, causing movement of the actuating rod 54 from the position of Fig. 5 to the position of Fig. 3 each time one of the cam projections 51 engages the cam portion 52. In the arrangement illustrated, the actuating rod will be raised and lowered four times for each complete revolution of the shaft 18. Each time the actuating rod is elevated, the bell crank member is moved from the dotted line position of Fig. 4 to the full line position therein to cause a suction stroke of the pump, taking in a charge of oil from the reservoir. At the same time, the spring 38 is compressed. Upon further movement of the worm shaft 18, to bring the cam projection 52 in between the cam portion 51 as shown in Fig. 5, then the spring 38 will expand to cause an ejection stroke of the pump, to transfer oil from the pump cylinder into the discharge conduit. After the discharge conduit has become completely filled with oil, it necessarily follows that upon each ejection stroke of the pump, oil will be forced onto the bearings 19 and onto the worm 17 to keep the same thoroughly lubricated.

While the invention is particularly well adapted for use in connection with tilting mechanisms for ladles, it is nevertheless susceptible of broader application. Various changes may, of course, be made in details of construction, without departing from the spirit of the invention, and all of such changes are contemplated as may come within the scope of the claims.

What I claim is:

1. An oiling device for use in connection with mechanism which includes a rotatable shaft comprising an oil reservoir, a pump, a conduit leading from said pump to the portions of the mechanism to be lubricated, actuating mechanism in connection with said pump including a rod extending upwardly therefrom and having its upper end hooked to extend around the upper portion of said rotatable shaft, a cam projecting from the inner surface of said hooked end, and cam mechanism on said rotatable shaft cooperable with the cam on said hooked end to support the upper end of the rod and automatically operate said rod and actuating mechanism when the shaft is rotated, said pump when actuated being adapted to draw in a charge of oil from the reservoir and deliver the same into said conduit.

2. In a ladle tilting device having a ladle provided with trunnions on which said ladle is supported for tilting movement, a worm wheel secured to one of said trunnions, a worm engageable with said worm wheel, a shaft for said worm, bearings for said worm shaft, a shallow housing for said worm wheel, worm and worm shaft, means for rotating said worm shaft to effect tilting movement of the ladle, a reservoir for oil, a pump, said pump being operable in one direction to draw in a charge of oil from said reservoir, yielding means for operating the pump in a return direction to eject oil therefrom, actuating mechanism in connection with said pump for operating it in said first direction and including a rod extending upwardly therefrom and having its upper end hooked to extend around the upper portion of said worm shaft, a cam projecting from the inner surface of said hooked end, cam mechanism on said worm shaft cooperable with the cam on said hooked end to support the upper end of the rod and automatically operate said rod and actuating mechanism a plurality of times for each revolution of the shaft when the latter is rotated, and a conduit for ejected oil leading from the pump to a position above said worm, said conduit having discharge apertures therein positioned to direct oil onto the worm.

3. An oiling device for use in connection with mechanism which includes a rotatable shaft comprising an oil reservoir, a pump, said pump being operable in one direction to draw in a charge of oil from said reservoir, yielding means for operating the pump in a return direction to eject oil therefrom, a bell crank in connection with said pump, cam mechanism on said rotatable shaft including a plurality of cam projections, a rod extending from said bell crank and having its outer end hooked around the cam mechanism on the rotatable shaft whereby said outer end is supported, a cam projecting from the inner surface of said hooked end and cooperable with the cam mechanism on the rotatable shaft whereby the rod is reciprocated to cause operation of the pump a plurality of times for each revolution of the rotatable shaft depending upon the number of cam projections on said shaft, and a conduit for ejected oil leading from the pump to the portions of the mechanism to be lubricated.

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